What Can CMMI Learn From the PMBOK?

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Outline

- Overview
- Considerations for Comparison
- High Level Comparison of the PMBOK & CMMI
- Advantages of the PMBOK Process Structure
- Which PMBOK Processes Can Enhance CMMI Implementations
- How the PMBOK Supplements CMMI
- Summary

Overview

- PMBOK provides additional project management processes not addressed by CMMI
- CMMI addresses most of the PMBOK processes and CMMI provides a process management structure as well as Systems and Software Engineering Best Practices

- ***Combining them will result in better and more complete project management of engineering endeavors***

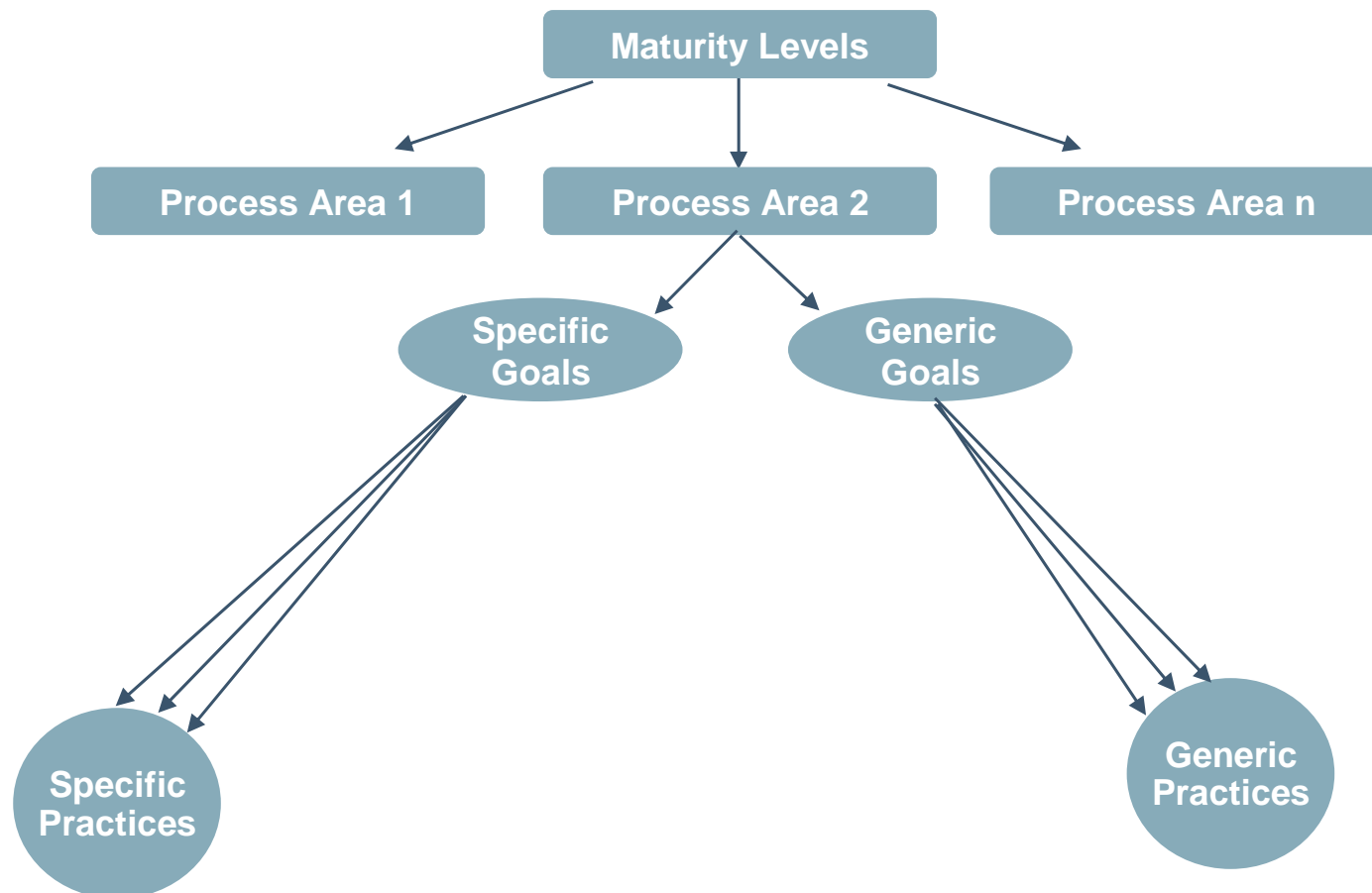# Considerations for Comparison

Coverage

- CMMI
  - Addresses Project Management of engineering endeavors
  - Addresses a larger organization composed of engineering projects
- PMBOK
  - Addresses Project Management without addressing the type of project or directly addressing the larger organization
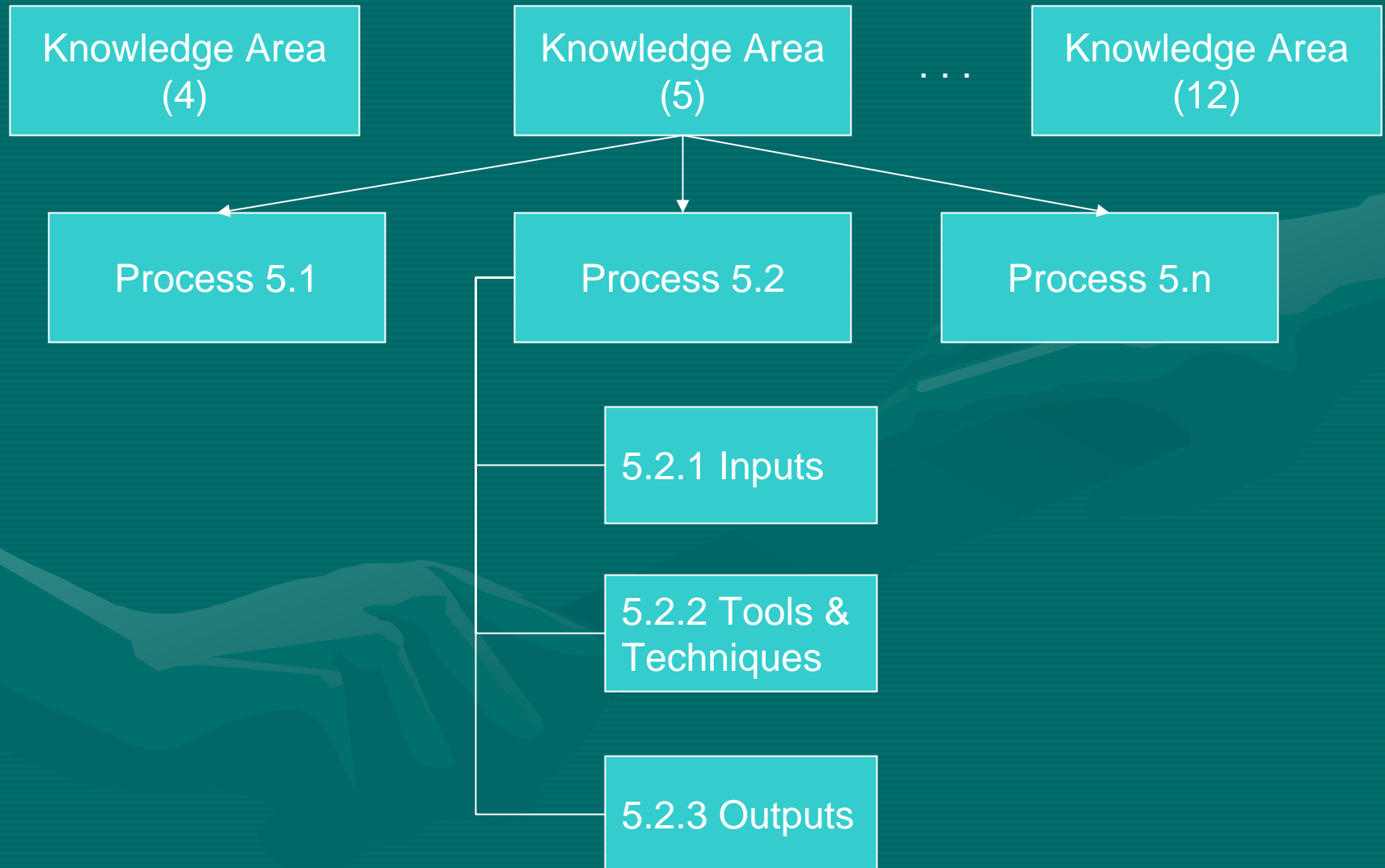- The depth of coverage varies between the documents

Structure

- It should be noted that while both have a project management focus, the focus and structure of the documents is different
  - PMBOK supports training Project Managers for Project Management Professional (PMP) certification
  - CMMI supports organizational process improvement for achievement of maturity/capability levels

PMBOK Components

Knowledge Area (4)

Knowledge Area (5)

. . .

Knowledge Area (12)

Process 5.1

Process 5.2

Process 5.n

5.2.1 Inputs

5.2.2 Tools & Techniques

5.2.3 Outputs

High Level Comparison of CMMI & PMBOK

Processes Addressed by Both

- Requirements Management or Scope Control
- Project Planning
- Managing and Controlling Project Execution
- Quality Assurance
- Supplier Management
- Risk Management
- Measurement

"Grey" Areas

- The following are implied or partly addressed by the PMBOK
  - Configuration Management
  - Causal Analysis
  - Generic Practices

- The following is partly addressed by CMMI
  - Human Resource Management

"Grey" Areas (continued)

- The following are definition or context differences
  - Verification and Validation – Definitions in both documents are basically reversed
  - Risk – In the PMBOK, risk is an uncertainty and can be positive or negative
  - Procurement Management – PMBOK considers buyer and seller points of view
  - Progressive Elaboration as opposed to Establish and Maintain

How CMMI Supplements PMBOK

- Engineering Best Practices
- Organizational Process Management

- Data Management
- Decision Analysis

Advantages of the PMBOK Process Structure

Inputs and Outputs

- Definitions from the PMBOK
  - Input - Any item whether internal or external to the project that's required by a process before the process proceeds. Maybe an output from a predecessor process.
  - Output - A product, result or service generated by a process. Maybe an input to successor processes.
- "Inputs" provide information necessary to perform the work of the process or a CMMI practice
- "Outputs" are similar to "Typical Work Products" in CMMI

Inputs and Outputs (continued)

- PMBOK provides a mostly consistent set of Inputs and Outputs (always references a given item the same way)

- *This improves the linkage and flow among processes and*

- *This approach can reduce the number of work products (Direct Artifacts) required for implementation*

Tools and Techniques

- Definitions from PMBOK
  - Tool – Something tangible, such as a template or software program, used in performing an activity to produce a product or result.
  - Technique – A defined systematic procedure used by a human resource to perform an activity to produce a product or result or deliver a service, that may employ one or more tools.

Tools and Techniques
(continued)

- PMBOK suggests tools with descriptions and some examples
  - Provides sufficient information so you can understand how the tool works
  - In specific cases, shows examples so you can understand how to use the tool

- *This assists the implementer in determining which tools and techniques will be of benefit to their situation*

Example Tools

- Arrow Diagramming Method used to develop Project Schedule

- Graphic examples of project schedules

- Examples of risk parameters and risk analysis tools

- Earned Value Management formulas and examples used for Performance Reporting

- Statistical Control Charts used for Quality Control

- Pareto Diagrams used for Causal Analysis

PMBOK Process Groupings

- Initiating - includes project and phase startup processes

- Planning - includes planning processes and development of planning documents

- Executing - includes implementation processes

- Monitoring and Controlling – includes processes for monitoring scope, schedule, and quality

- Closing – includes project and contract closeout processes

Process Group Interactions

- Five process groups are required for the management of any project
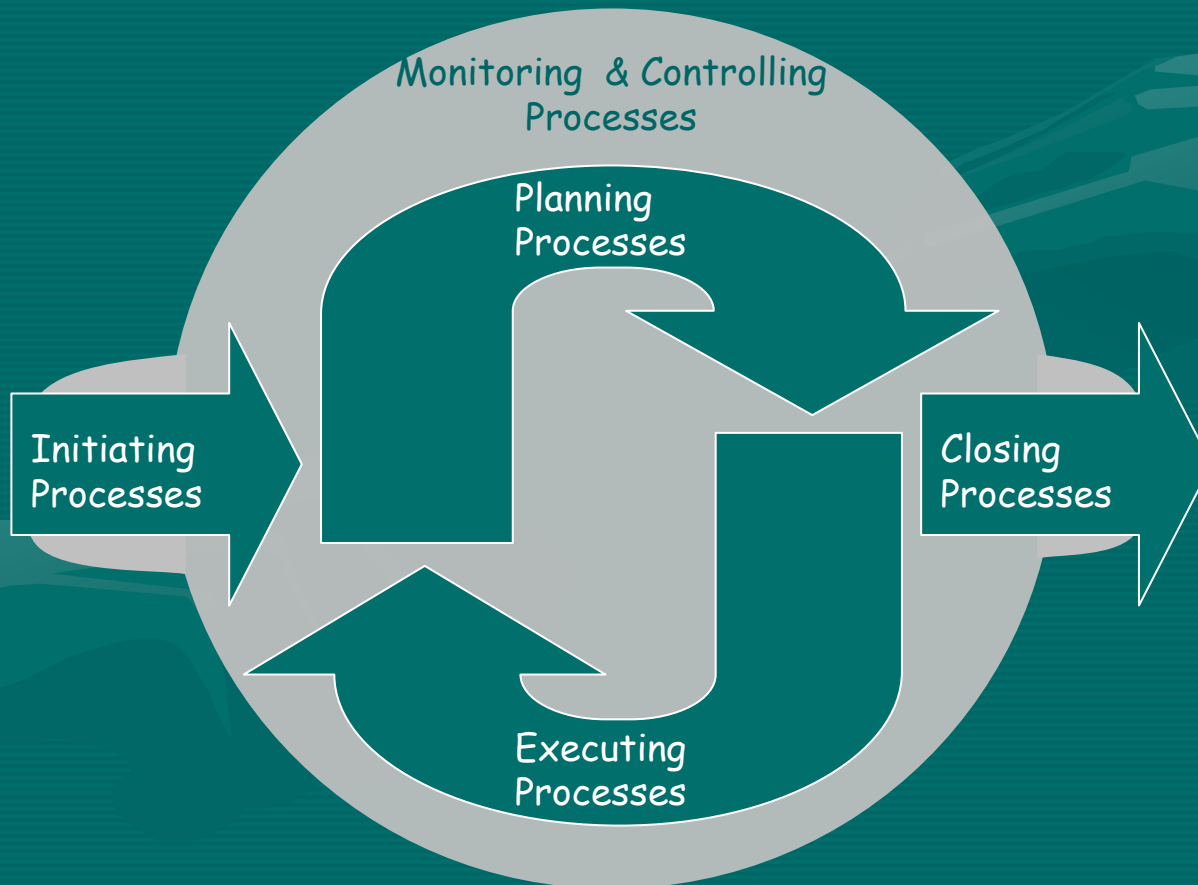
Which PMBOK Processes Will Enhance CMMI Implementations?

Project Charter

- Provides justification for selecting a project for implementation

- Issued by sponsor external to the project organization

- Formally authorizes existence of a project

- Identifies and gives authority to project manager

Close Contract/Project

- Creates and executes administrative closure and contract closure procedures
- Procedures are part of Project Management Plan
- Administrative closure procedures
  - Contains activities and responsibilities of project participants
  - Includes procedures to transfer the product to production
  - Step-by-step methodology documents required completion and exit criteria for the project

Close Contract/Project
(continued)

- Contract closure procedures
  - Step-by-step methodology documents required completion and exit criteria for the contract
  - Contains activities and responsibilities of project participants
  - Formally closes all contacts associated with the completed project
- Procurement audits
- Verification that all contract work and deliverables are acceptable

Close Contract/Project
(continued)

- Formal acceptance and handover of final product
- Organizational Process Asset Updates
  - Formal acceptance documentation
  - Project/Contract files
  - Project Closure documents
  - Historical information
  - Lessons learned

How the PMBOK Supplements CMMI

How PMBOK Supplements CMMI

- More guidance and details on planning
  - Additional Planning Documents:
    - Scope Management Plan,
    - Schedule Management Plan,
    - Cost Management Plan,
    - Staffing Management Plan,
    - Communications Management Plan, and
    - Procurement Management Plan

How PMBOK Supplements CMMI

- More guidance and details on planning (continued)
  - Project Time Management:
    - Activity Definition,
    - Activity Sequencing,
    - Activity Resource Estimating,
    - Activity Duration Estimating,
    - Schedule Development, and
    - Several possible support tools

How PMBOK Supplements CMMI

- More guidance and details on management and control
  - Performance measurement analysis and forecasting using earned value calculations – formulas and examples are provided
  - Integrated change control details (emphasizes maintaining baselines and plans, implementing corrective action, defect repair, etc.)

How PMBOK Supplements CMMI

- More guidance and details on Human Resource Management
  - Human resource planning
  - Acquiring the project team
  - Developing the project team
  - Managing the project team

- *Considers the personnel assigned to the project*

How PMBOK Supplements CMMI

- More guidance and details on Quality Assurance
  - Quality Planning
    - Considers Cost of Quality
    - Suggests tools with descriptions: Design of Experiments, Cost-Benefit Analysis, Benchmarking
  - Quality Control
    - Suggests tools and techniques with descriptions and some examples: cause and effect diagram, control charts, flowcharting, histogram, Pareto chart, run chart, scatter diagram, statistical sampling, defect repair review
    - Links outputs back into the implementing processes

How PMBOK Supplements CMMI

- More guidance and details on risk
  - Risk planning and budgeting
  - Example risk parameters
  - More information on how to identify risks
  - Qualitative and quantitative risk analysis
  - Risk response planning

How PMBOK Supplements CMMI

- More guidance and details on contracting or Procurement Management
    - Considers buyer and seller
    - Request seller responses (solicitation)
    - Considerations for evaluation
    - Includes contract closure and payment

Summary

The Mappings Are Available

- Link to - https://bscw.sei.cmu.edu/pub/bscw.cgi/0/79783

- Click on "Comparisons of CMMI & Other Standards/References"

- Then click on "CMMI and PMBOK"

- There will be three files, start with "CMMI and PMBoK Mappings"

Conclusions

- *PMBOK provides a more complete (end to end) Project Management set of processes, with a defined beginning and a defined ending*

- *PMBOK inputs and outputs provide linkage and flow among processes*

- *PMBOK provides tools and techniques for implementing CMMI practices including explanations and examples*

Contact Information

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